This is not a falling star or a comet, it is the trail of the Soviet earth satellite. The fiery streak gleams among the stars as though someone had struck a match on the roof of the universe.

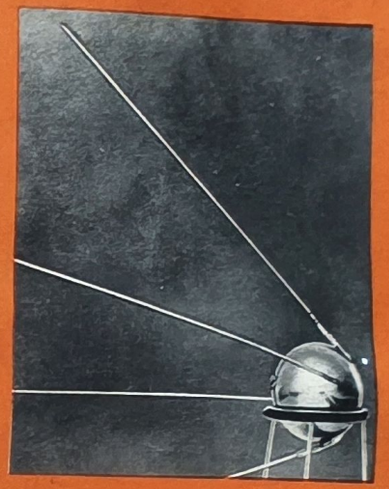
The first space traveller herself. Her cabin was equipped with an air-conditioning plant, food and oxygen supplies, various instruments and apparatus for studying the effect of the absence of gravity and other features of space flight on the living organism.

"Man will not remain eternally on Earth; in pursuit of light and space he will venture at first timidly beyond the confines of the atmosphere, and then conquer all space in the region of the Sun."

K. Tsiolkovsky.

Facing the Cosmos

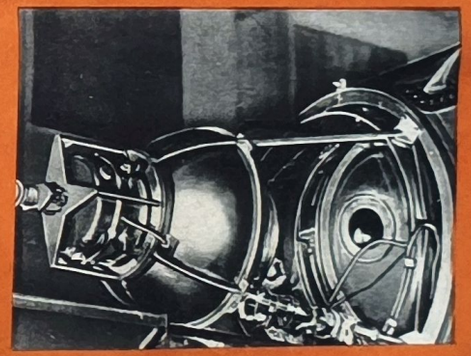
U. S. S. R. Section: Brussels Universal and International Exhibition. 1958



Here it is, the first artificial satellite in the world, a silvery white aluminium sphere gleaming like a mirror, with slender projecting aerial rods.

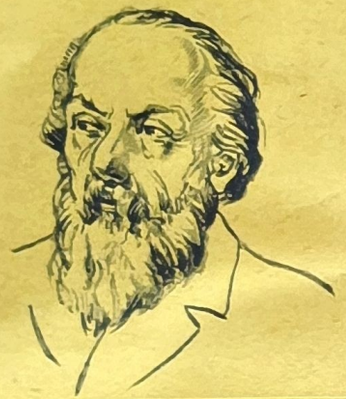
Centuries may pass, but this image of the sputnik will remain in the minds of men, because it was the first.

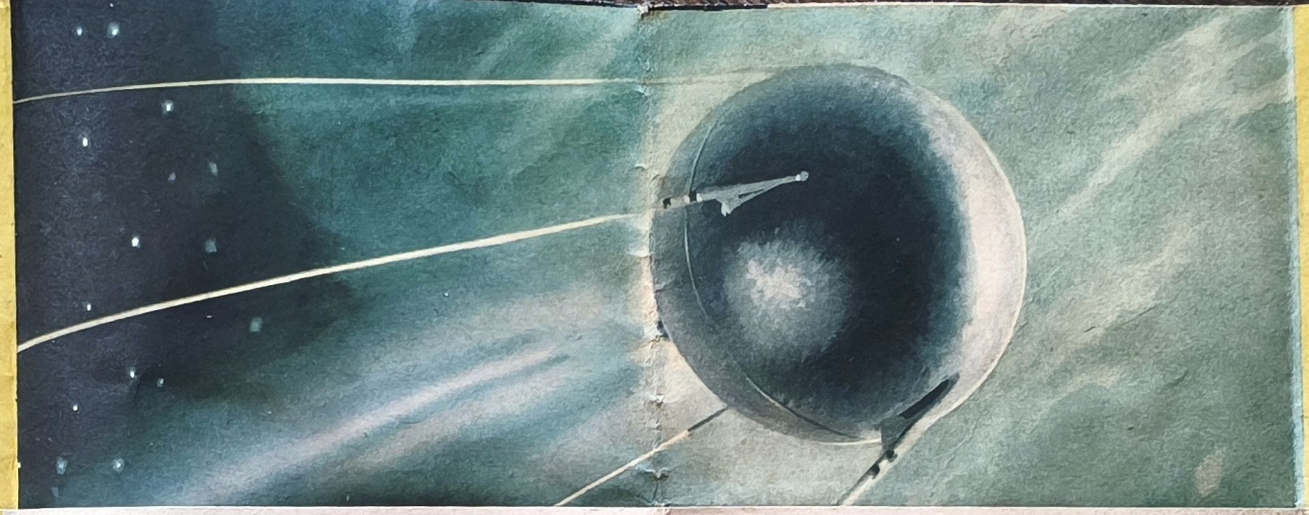
The sphere's metal casing contains radio-transmitters, electric batteries, and various instruments. Some of Man's most ingenious inventions were sent into the cosmos to speak from there in the radio language of the "Bleep".

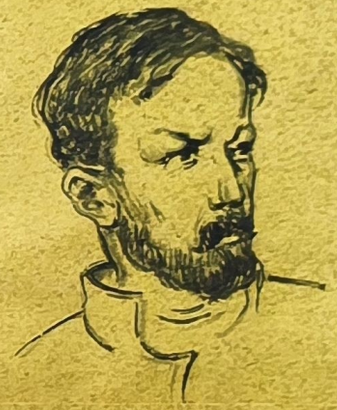


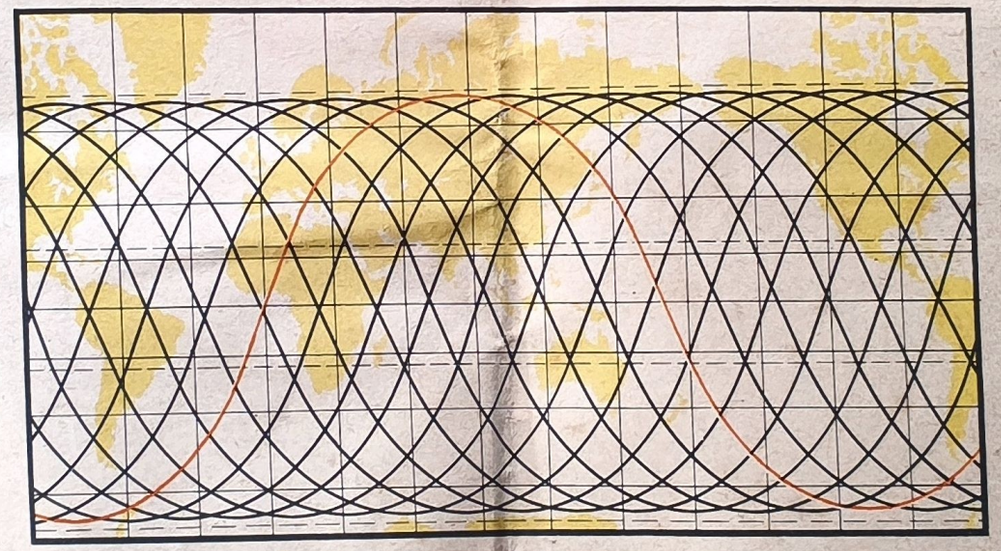
Here we see the front section of the second sputnik. As soon as the sputnik penetrated the cosmos, the protective nose cap was thrown off to expose the scientific apparatus.

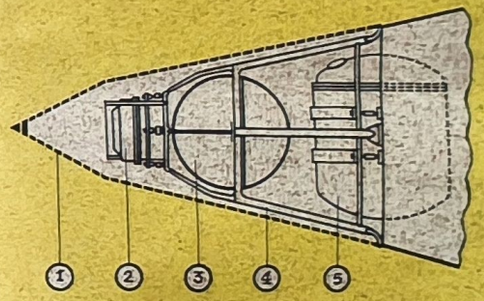
The instruments in front are for studying solar radiation. The sphere contains two radio-transmitters, a battery, various instruments, and also apparatus for transmitting data to the Earth. On the right we see the hermetically sealed cabin in which Laika made her trip into the cosmos.











ROUTE OF THE SPUTNIK

What route should be chosen for the artificial satellite that was to be launched in accordance with the research programme of the International Geophysical Year? Obviously one that would take it over all the continents of the world, making it possible to gain the maximum amount of scientific information. Though more difficult than others, such a route was chosen for the firstling of the cosmos. After taking off from the territory of the Soviet Union, the rocket carried the sputnik to a height of 900 km., and at a speed of approximately 8 km. per second the sputnik began to fly in an orbit round the Earth at an angle of 65° to the equator.

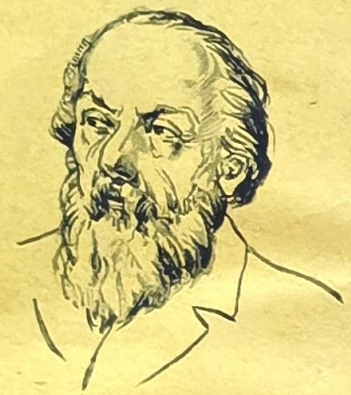
From the diagram one can see how, as the globe revolved, the sputnik wove a kind of invisible cocoon of its trajectories round it, swathing nearly the whole of the Earth's surface from pole to pole.

EQUIPMENT OF THE COSMIC LABORATORY

This is a plan of the lay-out of the second sputnik. The second sputnik was able to give far more detailed information than the first about the results of its investigations in cosmic space — data on the condition of its animal passenger, its breathing and pulse, on solar radiation and the mysterious cosmic rays, and on many other things besides.

In comparison with the first sputnik, its successor was better "educated". In the language of radio it was able to tell us in far greater detail what it saw and how it felt.

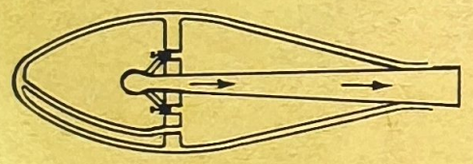
In the diagram: 1 — discardable protective cone; 2 — instruments for investigating solar ultra-violet and infra-red radiation; 3 — sphere containing transmitters and other apparatus; 4 — supporting frame; 5 — Laika's cabin.

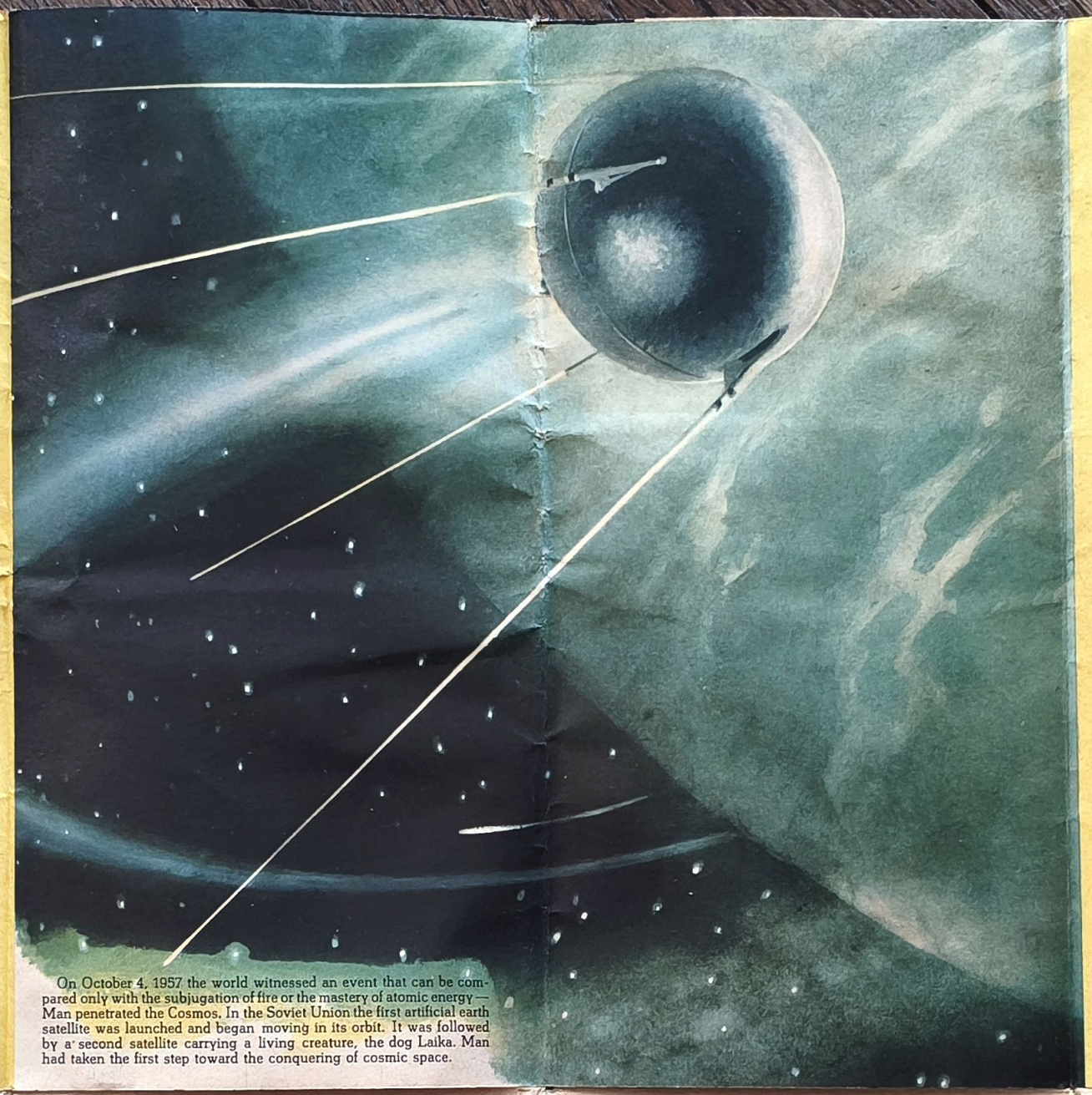


THE MAN WHOSE DREAMS WERE REAL

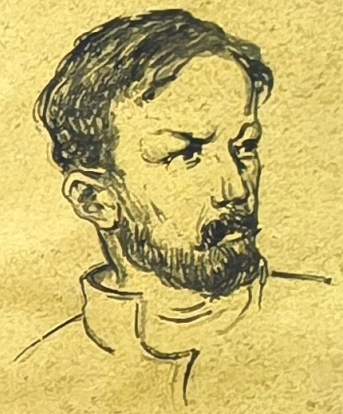
The man who 50 years ago foresaw that this would come to pass was the Russian scientist Konstantin Tsiolkovsky. It was he who indicated the way to master the cosmos, worked out a design for a cosmic rocket, suggested the creation of artificial earth satellites, and laid the foundation for voyages to the stars. When he died an old man, he entrusted all his scientific works to the Soviet people and expressed the hope that the Soviet state and the Communist Party would help them to realize his dreams.

Tsiolkovsky was not mistaken. His dreams have become reality.





On October 4, 1957 the world witnessed an event that can be compared only with the subjugation of fire or the mastery of atomic energy — Man penetrated the Cosmos. In the Soviet Union the first artificial earth satellite was launched and began moving in its orbit. It was followed by a second satellite carrying a living creature, the dog Laika. Man had taken the first step toward the conquering of cosmic space.



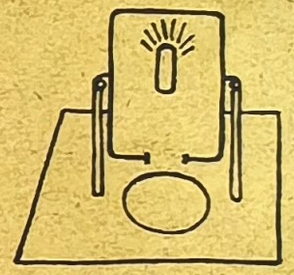
REVOLUTIONARY'S INVENTION

Nikolai Kibalchich, a student member of the Narodnaya Volya (People's Will) movement against tsarism, may rightly be considered one of the pioneers of cosmic exploration.

Condemned to death, Kibalchich requested permission to meet scientists to inform them of a discovery he had made. Permission was refused by the police.

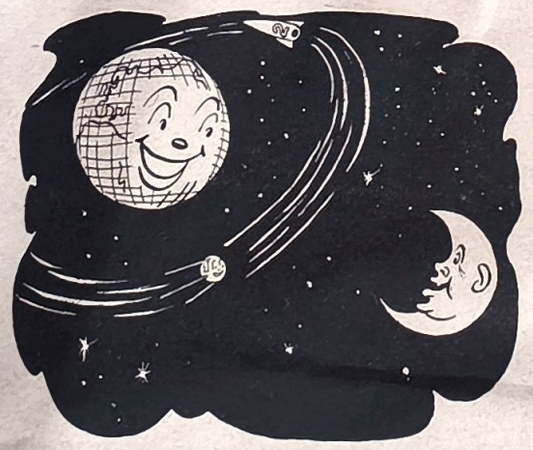
In his will Kibalchich wrote that he had invented an engine for movement through the air, and also for movement in a vacuum — the engine of the future.

Kibalchich's invention was a rocket engine working on gunpowder, the first proposal to use a jet engine for human flight. But that discovery was buried in police records and many years passed before it became known to humanity.



Sputnik talk:

To launch the sputnik a three-stage rocket was needed: industry, technology, science.



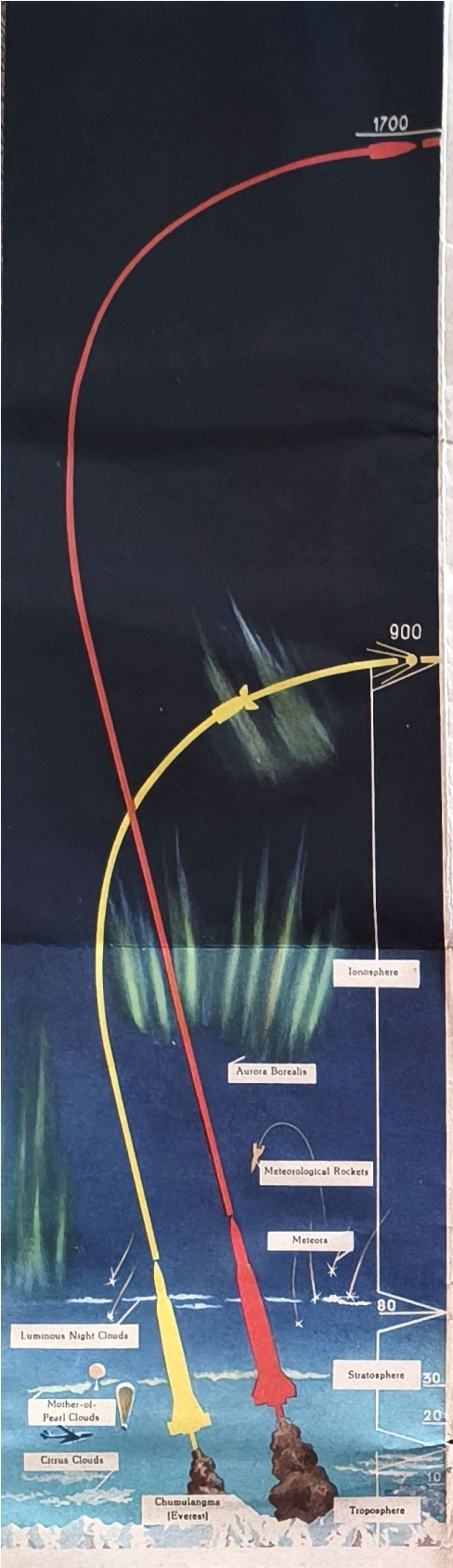
Congratulations, Mrs. Moon! You have a little baby brother weighing 86 kilograms and a sister weighing half a ton!

Tough owner: "No sputnik's going to fly over my territory!"

I'm waiting to see the Soviet Ambassador: I'm told they need an elephant for the next sputnik!

(From Hindustan Times)

Внешторгиздат. Заказ № Б-798-14



FIRST ASSAULT ON THE COSMOS

The ladder of human knowledge led step by step to the heavens. Men climbed high mountains and the sky seemed a little nearer. When they soared to the fringe of the atmosphere in aeroplanes and balloons, they almost believed they were "knocking on the roof of the sky". Aerial test balloons with radio-sets went even higher, floating to the last boundary of the aerial ocean.

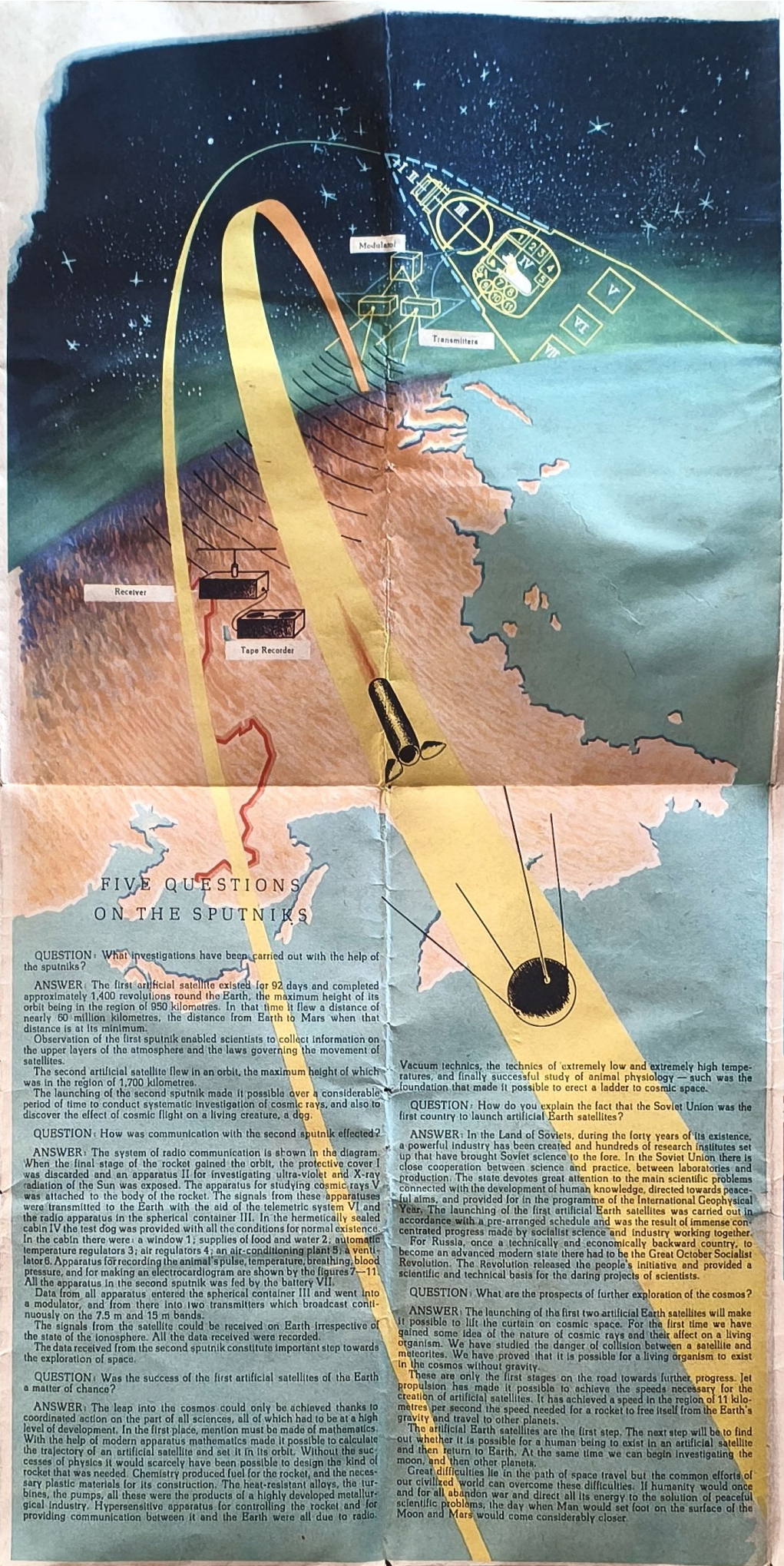
Then meteorological rockets were launched to a height of over 100 km. But in a few minutes they fell to earth without having time to tell the scientists what they were interested in knowing.

The first sputnik, called the "baby moon", gained a height of 900 km.

The second sputnik, launched a month after the first, flew twice as high, reaching an altitude of 1,700 km., a region never before penetrated by a man-created thing.

The second sputnik is much bigger than its predecessor and can hardly be described as a "baby moon". It weighs over half a ton and with its help many secrets of the universe have been discovered.

Human reason, concentrated in the apparatus of the artificial Earth satellites, will be able to reveal to us the mysteries of the cosmos and help us to proceed boldly to the exploration of other worlds.



FIVE QUESTIONS ON THE SPUTNIKS

QUESTION: What investigations have been carried out with the help of the sputniks?

ANSWER: The first artificial satellite existed for 92 days and completed approximately 1,400 revolutions round the Earth, the maximum height of its orbit being in the region of 950 kilometres. In that time it flew a distance of nearly 60 million kilometres, the distance from Earth to Mars when that distance is at its minimum.

Observation of the first sputnik enabled scientists to collect information on the upper layers of the atmosphere and the laws governing the movement of satellites.

The second artificial satellite flew in an orbit, the maximum height of which was in the region of 1,700 kilometres.

The launching of the second sputnik made it possible over a considerable period of time to conduct systematic investigation of cosmic rays, and also to discover the effect of cosmic flight on a living creature, a dog.

QUESTION: How was communication with the second sputnik effected?

ANSWER: The system of radio communication is shown in the diagram. When the final stage of the rocket gained the orbit, the protective cover I was discarded and an apparatus II for investigating ultra-violet and X-ray radiation of the Sun was exposed. The apparatus for studying cosmic rays V was attached to the body of the rocket. The signals from these apparatuses were transmitted to the Earth with the aid of the telemetric system VI and the radio apparatus in the spherical container III. In the hermetically sealed cabin IV the test dog was provided with all the conditions for normal existence. In the cabin there were: a window 1; supplies of food and water 2; automatic temperature regulators 3; air regulators 4; an air-conditioning plant 5; a ventilator 6. Apparatus for recording the animal's pulse, temperature, breathing, blood pressure, and for making an electrocardiogram are shown by the figures 7—11. All the apparatus in the second sputnik was fed by the battery VII.

Data from all apparatus entered the spherical container III and went into a modulator, and from there into two transmitters which broadcast continuously on the 7.5 m and 15 m bands.

The signals from the satellite could be received on Earth irrespective of the state of the ionosphere. All the data received were recorded.

The data received from the second sputnik constitute important step towards the exploration of space.

QUESTION: Was the success of the first artificial satellites of the Earth a matter of chance?

ANSWER: The leap into the cosmos could only be achieved thanks to coordinated action on the part of all sciences, all of which had to be at a high level of development. In the first place, mention must be made of mathematics. With the help of modern apparatus mathematics made it possible to calculate the trajectory of an artificial satellite and set it in its orbit. Without the successes of physics it would scarcely have been possible to design the kind of rocket that was needed. Chemistry produced fuel for the rocket, and the necessary plastic materials for its construction. The heat-resistant alloys, the turbines, the pumps, all these were the products of a highly developed metallurgical industry. Hypersensitive apparatus for controlling the rocket and for providing communication between it and the Earth were all due to radio. Vacuum technics, the technics of extremely low and extremely high temperatures, and finally successful study of animal physiology — such was the foundation that made it possible to erect a ladder to cosmic space.

QUESTION: How do you explain the fact that the Soviet Union was the first country to launch artificial Earth satellites?

ANSWER: In the Land of Soviets, during the forty years of its existence, a powerful industry has been created and hundreds of research institutes set up that have brought Soviet science to the fore. In the Soviet Union there is close cooperation between science and practice, between laboratories and production. The state devotes great attention to the main scientific problems connected with the development of human knowledge, directed towards peaceful aims, and provided for in the programme of the International Geophysical Year. The launching of the first artificial Earth satellites was carried out in accordance with a pre-arranged schedule and was the result of immense concentrated progress made by socialist science and industry working together.

For Russia, once a technically and economically backward country, to become an advanced modern state there had to be the Great October Socialist Revolution. The Revolution released the people's initiative and provided a scientific and technical basis for the daring projects of scientists.

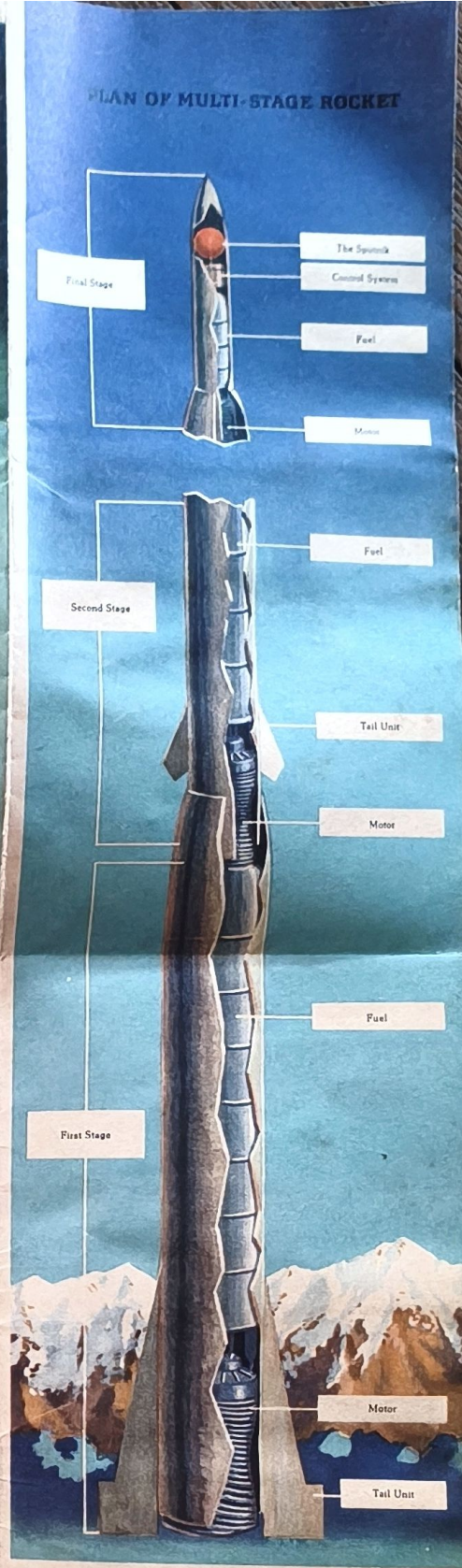
QUESTION: What are the prospects of further exploration of the cosmos?

ANSWER: The launching of the first two artificial Earth satellites will make it possible to lift the curtain on cosmic space. For the first time we have gained some idea of the nature of cosmic rays and their effect on a living organism. We have studied the danger of collision between a satellite and meteorites. We have proved that it is possible for a living organism to exist in the cosmos without gravity.

These are only the first stages on the road towards further progress. Jet propulsion has made it possible to achieve the speeds necessary for the creation of artificial satellites. It has achieved a speed in the region of 11 kilometres per second the speed needed for a rocket to free itself from the Earth's gravity and travel to other planets.

The artificial Earth satellites are the first step. The next step will be to find out whether it is possible for a human being to exist in an artificial satellite and then return to Earth. At the same time we can begin investigating the moon, and then other planets.

Great difficulties lie in the path of space travel but the common efforts of our civilized world can overcome these difficulties. If humanity would once and for all abandon war and direct all its energy to the solution of peaceful scientific problems, the day when Man would set foot on the surface of the Moon and Mars would come considerably closer.



The rocket that carried the aluminium sphere of the first sputnik into space had to have a great power capacity. In the last stage of its flight it must attain a speed of 8 km. per second, 29,000 km. p. h.!

This speed was achieved with the aid of the ballistic rocket built in the Soviet Union. The rocket is made in several stages, each of which increases the speed of the rocket and falls away when its fuel is exhausted. The final stage brings the sputnik to the required speed and then itself becomes a sputnik.

It is hard to exaggerate the difficulty of controlling the flight of a multiple rocket of this kind. The engine of each stage must start and stop operating at exactly the right moment, supersensitive apparatus is required to put the rocket into the proper orbit.

At first the rocket shoots up vertically. At the required height its flight becomes first inclined, then horizontal. The front section of the rocket then ejects the satellite that it is carrying or itself becomes a sputnik.

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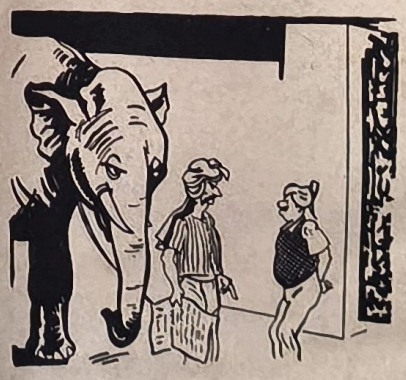
Congratulations, Mrs. Moon! You have a little baby brother weighing 86 kilograms and a sister weighing half a ton!

Tough owner: "No sputnik's going to fly over my territory!"



I'm waiting to see the Soviet Ambassador; I'm told they need an elephant for the next sputnik!

(From Hindustan Times)

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